

Claims

1. A process for producing an amino acid, which comprises culturing, in a medium, a microorganism obtainable by introducing a DNA coding for energy non-production NADH dehydrogenase, forming and accumulating an amino acid in a culture, and recovering the amino acid from the culture.
2. The process according to claim 1, wherein the DNA coding for energy non-production NADH dehydrogenase is a DNA derived from a microorganism selected from the group consisting of microorganisms belonging to the genus Corynebacterium, Escherichia, Pseudomonas, Azotobacter, Salmonella or Lactobacillus, or a DNA which hybridizes, under stringent conditions, with a DNA having a nucleotide sequence complementary to the nucleotide sequence of the DNA.
3. The process according to claim 1, wherein the DNA coding for energy non-production NADH dehydrogenase is a DNA derived from a microorganism selected from the group consisting of microorganisms belonging to the species Corynebacterium glutamicum, Corynebacterium diphtheriae, Escherichia coli, Pseudomonas fluorescens, Azotobacter vinelandii, Salmonella typhimurium or Lactobacillus plantarum, or a DNA which hybridizes, under stringent conditions, with a DNA having a

nucleotide sequence complementary to the nucleotide sequence of the DNA.

4. The process according to claim 1, wherein the DNA coding for energy non-production NADH dehydrogenase is a DNA having a nucleotide sequence selected from the group consisting of nucleotide sequences represented by SEQ ID NOs: 3, 5, 7, 9, 11, 13 and 15, or a DNA which hybridizes, under stringent conditions, with a DNA having a nucleotide sequence complementary to the nucleotide sequence.

5. The process according to claim 1, wherein the DNA coding for energy non-production NADH dehydrogenase is a DNA coding for energy non-production NADH dehydrogenase possessed by a plasmid pCS-CGndh carried by Escherichia coli DH5 α /pCS-CGndh (FERM BP-08633) or a DNA which hybridizes, under stringent conditions, with a DNA having a nucleotide sequence complementary to the nucleotide sequence of the DNA and which encodes a polypeptide having the energy non-production NADH dehydrogenase activity.

6. The process according to claim 1, wherein the energy non-production NADH dehydrogenase is a polypeptide having an amino acid sequence selected from the group consisting of amino acids sequences represented by SEQ ID NOs: 4, 6, 8, 10, 12,

14 and 16, or a polypeptide comprising an amino acid sequence wherein one or more amino acid residues are deleted, substituted or added in the amino acid sequence of the polypeptide and having the energy non-production NADH dehydrogenase activity.

7. The process according to claim 1, wherein the energy non-production NADH dehydrogenase is a polypeptide encoded by the DNA coding for energy non-production NADH dehydrogenase possessed by a plasmid pCS-CGndh carried by Escherichia coli DH5 α /pCS-CGndh (FERM BP-08633) or a polypeptide comprising an amino acid sequence wherein one or more amino acid residues are deleted, substituted or added in the amino acid sequence of the polypeptide and having the energy non-production NADH dehydrogenase activity.

8. The process according to any one of claims 1 to 7, wherein the microorganism into which the DNA coding for energy non-production NADH dehydrogenase is introduced is a microorganism selected from the group consisting of microorganisms belonging to the genus Escherichia, Corynebacterium, Brevibacterium, Arthrobacter, Aureobacterium, Cellulomonas, Clavibacter, Curtobacterium, Microbacterium, Pimerobacter or Bacillus.

9. The process according to any one of claims 1 to 7, wherein the microorganism into which the DNA coding for energy non-production NADH dehydrogenase is introduced is a microorganism belonging to the genus Escherichia.

10. The process according to any one of claims 1 to 7, wherein the microorganism into which the DNA coding for energy non-production NADH dehydrogenase is introduced is a microorganism belonging to the species Escherichia coli.

11. The process according to any one of claims 1 to 7, wherein the microorganism into which the DNA coding for energy non-production NADH dehydrogenase is introduced is a microorganism belonging to the genus Corynebacterium.

12. The process according to any one of claims 1 to 7, wherein the microorganism into which the DNA coding for energy non-production NADH dehydrogenase is introduced is a microorganism selected from the group consisting of microorganisms belonging to the species Corynebacterium glutamicum, Corynebacterium flavum, Corynebacterium lactofermentum, or Corynebacterium efficiens.

13. The process according to any one of claims 1 to 7, wherein the microorganism into which the DNA coding for energy

non-production NADH dehydrogenase is introduced is a microorganism belonging to the species Corynebacterium glutamicum.

14. The process according to any one of claims 1 to 13, wherein the amino acid is an amino acid selected from the group consisting of L-glutamic acid, L-glutamine, L-aspartic acid, L-asparagine, L-lysine, L-methionine, L-threonine, L-arginine, L-proline, L-citrulline, L-valine, L-leucine, L-isoleucine, L-serine, L-cysteine, glycine, L-tryptophan, L-tyrosine, L-phenylalanine and L-histidine.

15. The process according to any one of claims 1 to 13, wherein the amino acid is an amino acid selected from the group consisting of L-glutamic acid, L-glutamine and L-lysine.

16. A microorganism which belongs to the genus Corynebacterium, and is obtainable by introducing a DNA coding for energy non-production NADH dehydrogenase.

17. A microorganism which belongs to the species Corynebacterium glutamicum, and is obtainable by introducing a DNA coding for energy non-production NADH dehydrogenase.

18. The microorganism according to claim 16 or 17, wherein

the DNA coding for energy non-production NADH dehydrogenase is a DNA derived from a microorganism selected from the group consisting of microorganisms belonging to the genus Corynebacterium, Escherichia, Pseudomonas, Azotobacter, Salmonella or Lactobacillus, or a DNA which hybridizes, under stringent conditions, with a DNA having a nucleotide sequence complementary to the nucleotide sequence of the DNA.

19. The microorganism according to claim 16 or 17, wherein the DNA coding for energy non-production NADH dehydrogenase is a DNA derived from a microorganism selected from the group consisting of microorganisms belonging to the species Corynebacterium glutamicum, Corynebacterium diphtheriae, Escherichia coli, Pseudomonas fluorescens, Azotobacter vinelandii, Salmonella typhimurium or Lactobacillus plantarum, or a DNA which hybridizes, under stringent conditions, with a DNA having a nucleotide sequence complementary to the nucleotide sequence of the DNA.

20. The microorganism according to claim 16 or 17, wherein the DNA coding for energy non-production NADH dehydrogenase is a DNA having a nucleotide sequence selected from the group consisting of nucleotide sequences represented by SEQ ID NOs: 3, 5, 7, 9, 11, 13 and 15, or a DNA which hybridizes, under stringent conditions, with a DNA having a nucleotide sequence

complementary to the nucleotide sequence.

21. The microorganism according to claim 16 or 17, wherein the DNA coding for energy non-production NADH dehydrogenase is a DNA coding for energy non-production NADH dehydrogenase possessed by a plasmid pCS-CGndh carried by Escherichia coli DH5 α /pCS-CGndh (FERM BP-08633) or a DNA which hybridizes, under stringent conditions, with a DNA having a nucleotide sequence complementary to the nucleotide sequence of the DNA and which encodes a polypeptide having the energy non-production NADH dehydrogenase activity.

22. The microorganism according to claim 16 or 17, wherein the energy non-production NADH dehydrogenase is a polypeptide having an amino acid sequence selected from the group consisting of amino acids sequences represented by SEQ ID NOs: 4, 6, 8, 10, 12, 14 and 16, or a polypeptide comprising an amino acid sequence wherein one or more amino acid residues are deleted, substituted or added in the amino acid sequence of the polypeptide and having the energy non-production NADH dehydrogenase activity.

23. The microorganism according to claim 16 or 17, wherein the energy non-production NADH dehydrogenase is a polypeptide encoded by a DNA possessed by a plasmid pCS-CGndh carried by

Escherichia coli DH5 α /pCS-CGndh (FERM BP-08633) or a polypeptide comprising an amino acid sequence in which one or more amino acid residues are deleted, substituted or added in the amino acid sequence of the polypeptide and having the energy non-production NADH dehydrogenase activity.

24. Corynebacterium glutamicum ATCC 14752/pCS-CGndh or Corynebacterium glutamicum FERM BP-1069 / pCS-CGndh.

25. Escherichia coli DH5 α /pCS-CGndh (FERM BP-08633).

26. Plasmid pCS-CGndh carried by Escherichia coli DH5 α /pCS-CGndh (FERM BP-08633).